

Patent claims

1. A heat exchanger, in particular a condenser or gas cooler for air conditioning systems, in particular for motor vehicles, with at least two rows of flow ducts through which refrigerant is capable of flowing and which are received on the end face in manifolds, and with ribs which are arranged between the flow ducts and over which air is capable of flowing, individual flow ducts being arranged in a row and defining a plane, the main airflow direction being perpendicular to the plane, and the at least two rows being arranged in series in the airflow direction, characterized in that at least two rows (2, 3) of flow ducts (4) in the plane are divided into at least two blocks (I, II), and each block (I, II) is divided perpendicularly to the planes in at least two segments (Ia, Ib; IIa, IIb) of flow ducts (4), the flow being capable of passing through the segments (Ia, Ib, IIa, IIb) on the refrigerant side in series in such a way that a deflection perpendicular to the planes (UT1, UT2) or a deflection in the plane (UB1, UB2) or a deflection both in the plane and perpendicular to the plane (UBT1, UBT2) takes place between individual segments.
2. The heat exchanger as claimed in claim 1, characterized in that part of the segments (IIa, IIIb), in particular that arranged downstream of the refrigerant side, is divided in the plane into subsegments (IIaa, IIab; IIIba, IIIbb).
3. The heat exchanger as claimed in claim 1 or 2, characterized in that a refrigerant inlet (8, KME) is arranged on a leeward-side segment (Ia).
4. The heat exchanger as claimed in claim 1 or 2, characterized in that a refrigerant inlet (8, KME) is arranged on a windward-side segment (Ia).

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5. The heat exchanger as claimed in one of claims 1 to 4, characterized in that a refrigerant outlet is arranged on a windward-side segment (IIIb).

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6. The heat exchanger as claimed in one of claims 1 to 4, characterized in that a refrigerant outlet is arranged on a leeward-side segment (IIIb).

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7. The heat exchanger as claimed in one of claims 1 to 6, characterized in that the number of blocks (I, II, III) is three, four, five or more.

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8. The heat exchanger as claimed in one of claims 1 to 7, characterized in that the deflections take place from segment to segment alternately perpendicularly to the planes (UT1) and in the planes (UB1).

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9. The heat exchanger as claimed in one of claims 1 to 7, characterized in that the deflections take place from segment to segment alternately perpendicularly to the planes (UT1) and both in the planes and perpendicularly to the planes (UBT1).

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10. The heat exchanger as claimed in one of claims 1 to 9, characterized in that the flow ducts are designed as flat tubes (4).

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11. The heat exchanger as claimed in one of claims 1 to 9, characterized in that at least two rows (2, 3) of flow ducts are formed by one row of continuous flat tubes (19) for which the flow is capable of passing in a two-flow or multiflow manner (19a, 19b).

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12. The heat exchanger as claimed in one of claims 1 to 11, characterized in that the deflection takes place perpendicularly to the planes (UT1, UT2) in a common manifold (5) which receives the ends (4a) of the two

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rows (2, 3) of flow ducts or flat tubes (4).

13. The heat exchanger as claimed in one of claims 1 to 12, characterized in that the deflection in the planes (UB1, UB2) takes place by means of partitions (9, 11) in a manifold (6, 7) in each case, each row (2, 3) of flow ducts or flat tubes (4) being assigned a manifold (6, 7).

10 14. The heat exchanger as claimed in one of claims 1 to 12, characterized in that the simultaneous deflection both in the planes and perpendicular to the planes (UBT1, UBT2) takes place by deflection members (12, 13) which connect to one another segments (Ib, IIb; IIa, IIIa) through which the flow is capable of passing in succession.

20 15. The heat exchanger as claimed in claims 10 and 13, characterized in that, for deflection in the planes, the manifolds (6', 7') are connected to one another by means of a web (18) to form a double tube (14).

25 16. The heat exchanger as claimed in claims 11 and 13, characterized in that, for deflection in the planes, the manifolds (6", 7") are designed as separate manifolds (6", 7") which are slipped onto the ends (19a', 19b') of the continuous flat tubes (19).

30 17. The heat exchanger as claimed in one of the preceding claims, characterized in that the heat exchanger is a gas cooler or a condenser (1, 10) which is designed as a soldered tube/rib block with manifolds arranged on both sides.